meanderings

The Newsletter of the New Hampshire Rivers Management and Protection Program

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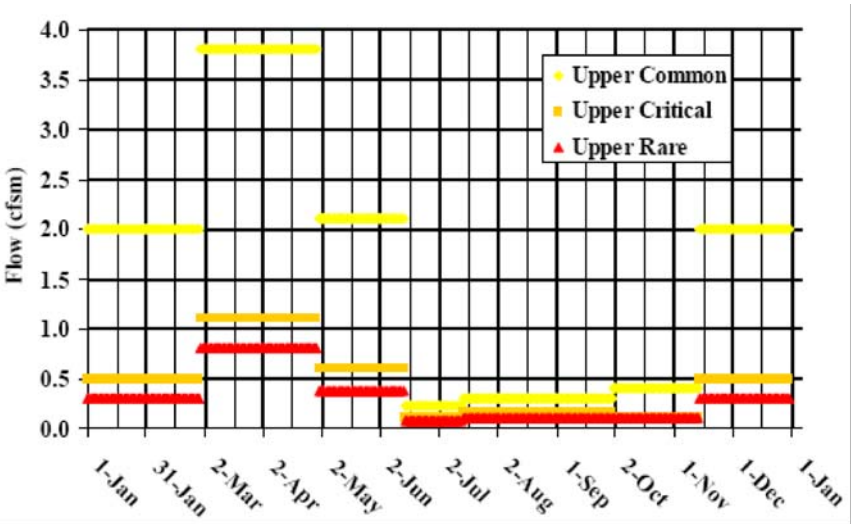
Protected Instream Flows established for the Souhegan Designated River

~Wayne Ives, Instream Flow Specialist

The Instream Flow Pilot Project reached a major milestone in 2008 when Commissioner Burack established protected instream flows for the Souhegan River. A designated river under the Rivers Management and Protection Program, the Souhegan River became the first designated river to conserve and protect its outstanding characteristics as water quality standards. Establishment means that these flows must be maintained as part of any permit condition related to the river. Implementation will be ensured through the development of a water management plan later this year.

The protected flows were developed by the University of New Hampshire under a contract with DES. UNH conducted a field study in 2004 through 2005. Analysis was completed and draft reports were presented to a technical review committee in early 2006. Because this is a pilot program, there were a lot of questions about the process. The report was augmented with additional appendices to provide more detailed descriptions of how the field data was processed to become the protected flows. DES felt it was well worth taking the time necessary to improve the first protected instream flow and to describe it as simply



PISF magnitudes and timing for the upper Souhegan River (csfm = cubic feet per second per square mile).

Protected Instream Flows, *continued on page 16*

EPA Recognizes N.H. Volunteers with President's Award

EPA Administrator Stephen L. Johnson honored New Hampshire leaders who volunteer to protect the state's designated rivers on Earth Day 2008 at historic Faneuil Hall in Boston.

The New Hampshire Rivers Management and Protection Program is made up of local advisory committees whose members contribute thousands of volunteer hours each year to protect 15 designated rivers in the state. The program is celebrating its 20th anniversary and this prestigious award truly honors all of the past and present volunteers.

Attending the ceremony were the following Local Advisory Committee representatives: Michelle Hamm, Contoocook and North Branch Rivers; Adair Mulligan, Connecticut River; Camilla Lockwood, Exeter River; Charlie Ryan, Ammonoosuc River; Michele Tremblay, Upper Merrimack River; Chip Boisvert, Swift River; Bob Robbins, Lower Merrimack River; Patrick Seekamp, Exeter River; Stephen Landry, Upper Merrimack River; Sharon Meeker, Lamprey River; and Elizabeth Evans, Isinglass River.

"Today we honor these New Hampshire leaders for answering President

EPA Award, *continued on page 18*

The RMPP Turns Twenty!

~Steve Couture, Rivers Coordinator

2008 marks the 20th anniversary of the landmark legislation known as the New Hampshire Rivers Management and Protection Program. This legislation (RSA 483) created a program to increase partnerships between the state and local communities around river protection. The purpose of the program is to protect New Hampshire's significant river resources for the benefit of present and future generations. Under the program, local communities can seek to designate rivers with outstanding characteristics and values. Once designated, a river benefits from increased protection, technical assistance and financial assistance at the state level. At the local level, local advisory committees (LACs)develop river corridor or watershed management plans and provide advisory input for municipal and state activities.

Over the past 20 years, 15 rivers have been designated throughout the state. These rivers are found racing though mountain valleys to meandering through our towns and cities; all contain outstanding characteristics and values. From our first five rivers designated in June 1990 (Lamprey, Upper Merrimack, Lower Merrimack, Saco and Swift Rivers) to the Ammonoosuc River designated in August 2007, the RMPP has continued to promote protection and stewardship of our river resources though education and outreach, and financial and technical assistance.

The creation of the RMPP in 1988 was the result of years of dedication by numerous individuals and organizations that recognized the urgent need to protect New Hampshire's rivers. One of the early advocates in New Hampshire was former state Senator Fredrick Porter, who in 1971 amended House Joint Resolution 46 to include the following statement: "Whereas, certain rivers in New Hampshire … possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values … be it resolved that … [the] State of New Hampshire declares that it is the policy … of the State that these rivers shall be preserved … for the benefit and enjoyment of the present and future generations." This language can be heard today in RSA 483, the legislation that established the RMPP.

In 1984, New Hampshire native Chris Brown was working for American Rivers, a national nonprofit river protection organization, to establish an outreach effort to build local interest in and spur grassroots organization around statewide river protection. Thanks to his efforts and the efforts of countless others, the New Hampshire Rivers Campaign (now NH Rivers Council or NHRC) was born. NHRC functioned as a coalition of river protection interests, and supported the legislative efforts that resulted in the RMPP. The motivation of passionate individuals like Fredrick Porter and Chris Brown are the reason for the RMPP's establishment and the reason that today the program is stronger than ever.

One of the most important aspects of the RMPP today is the dedication of the volunteers on each designated river's LAC. These individuals represent a broad range of interests, are nominated by each riverfront municipality, and serve as the DES commis-sioner's only appointed advisors. Each LAC is responsible for developing a local river corridor or watershed management plan and commenting on activities that might affect the river that require a state permit. The local development of this management plan and comments by the LAC result in decisions reflecting the needs, values and concerns of local citizens. Since the RMPPs inception, the LACs have served as the driving force behind local protection efforts of each of the designated rivers. Without the hours of dedication that LAC members contributed, these tremendous activities could not have occurred this year: the recently designated Ammonoosuc River LAC developed by-laws and has continued to hold monthly meetings, the Lower Merrimack LAC developed a permit review checklist to help ensure the water quality in the river is protected, and the Upper Merrimack, Ashuelot and Lamprey Rivers LACs all updated their river corridor management plans.

Thank you LAC members. Without your help our rivers would not be as well cared for!

Another important activity that has occurred in RMPP recently is the instream flow pilot project, which started in 2002 on the Souhegan and Lamprey rivers. Instream flow

20th Anniversary, *continued on page 18*

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29 Hazen Drive ~ PO Box 95
Concord, NH 03302-0095
(603) 271-8801

Thomas Burack ~ Commissioner
Harry T. Stewart ~ Director, Water Division
Steve Couture ~ Rivers Coordinator, Editor
Laura Weit ~ Assistant Planner
Jennifer Rowden ~ Assistant Planner
Pat Gruttemeyer ~ Layout/Design
Jacquie Colburn, Jen Drociak, Darlene Forst, Wayne Ives, Amy Smagula ~ DES Contributors

3 LACs Have Updated Management Plans

Developing a management plan for a river is a huge undertaking for any group, but updating a plan to tackle old issues along with new ones is even more challenging. In the last year the Ashuelot, Lamprey and Upper Merrimack Rivers Local Advisory Committees decided to take on the challenge of updating their management plans.

After a river is designated, a management plan is developed so that the outstanding qualities of the river may be protected for future generations (RSA 483:10). The plan is developed and implemented by the LAC, which also coordinates activities affecting the river on a regional basis. A typical plan identifies management goals and recommends actions that may be taken to protect the resources identified in the nomination. At the state level, DES assists with the development and implementation of the management plan and enforces regulations concerning the quality and quantity of flow in protected river segments.

The following are highlights from each river's updated management plan.

Ashuelot River

• Increased emphasis on land and habitat conservation with reference to The Nature Conservancy's 2004 "A Land Conservation Plan for the Ashuelot River."

• Summary information on the LAC's water quality monitoring data.

• Emphasis on the need for local governments, private organizations and academics to cooperate in order to protect the river corridor through education, management and planning.

Lamprey River

• Increased efforts to work with town conservation commissions and riverfront land owners to protect more land within the river corridor.

• Continued work with local communities and water users, along side the DES Instream Flow pilot project, to help ensure adequate water for both humans and wildlife.

• Goals to increase public education and stewardship of the river.

Upper Merrimack River

• Identification of 13 resource areas they consider unique or critical to the river corridor and developed goals and objectives aimed at protecting water resources, outstanding resources and riparian lands over the next five years.

• Continuation of the Upper Merrimack LAC's water quality and biomonitoring programs is strongly emphasized given the tremendous growth the towns in the corridor are experiencing.

All other designated rivers, with the exception of the newly designated Ammonoosuc River, have management plans in place or nearly completed. For more information on river management plans, please visit www.des.nh.gov/rivers/rivplans.htm or contact Steve Couture, (603) 271-8801 steven.couture@des.nh.gov.

Crawling along the Upper Merrimack

Michele L. Tremblay, Chair, Upper Merrimack River LAC

What do bugs, plans, and the web have in common? They're all part of the Upper Merrimack River Local Advisory Committee's (affectionately pronounced as "UM-RAH-LAC") focus and accomplishments in 2007.

2007 marked the Upper Merrimack Monitoring Program's 11th season of bacteria, habitat assessment, chemical, and biomonitoring activities in an aggressive 11-site program. The UMMP owes much of its success to scores of strong volunteers and municipal support from its Adopt-a-River Site sponsors including Aquarian Analytical Laboratories Inc.; Aries Engineering Inc.; Checkmate Expert Payroll Services; Elektrisola; Franklin Savings Bank; Franklin Wastewater Treatment Facility; PSNH Corporate Offices and Merrimack Station; and Watts Regulator/Webster Valve. Many thanks to the conservation commissions and towns and cities of Boscawen, Bow, Canterbury, Concord, Franklin and Northfield for their ongoing support and for graciously hosting Upper Merrimack River Local Advisory Committee meetings. The Concord Community Cooperative chose UMRLAC as one of its 12 nonprofits to receive a percentage of their monthly revenues.

The UMRLAC's first Upper Merrimack Monitoring and Implementation Plan, published in the mid-1990s, focused on corridor management. Working with Bill Arcieri, VHB Inc., under contract with the Central NH Regional Planning Commission, the UMRLAC completed its new plan that focuses on watershed management (see related article) and follows a logic model format. The new plan addresses emerging issues in the upper Merrimack and provides vision, guidance, and watershed management recommendations for state agencies and municipalities. It includes logic model measurable outcome sections on water quality, water quantity, agriculture, recreation, wildlife, historical and archeological, geologic and natural features, fish and aquatic, vegetation, buffers and setbacks, and land and open space. You can download and print the plan as a PDF or you can use the fun and interactive web-enabled version at MerrimackRiver.org.

What about the web? Well, of course, all of this information is on the web in the UMRLAC's snazzy new website (completely re-designed in 2007)! To start your own river crawl, visit the Upper Merrimack at merrimackriver.org.

Progress and Challenges

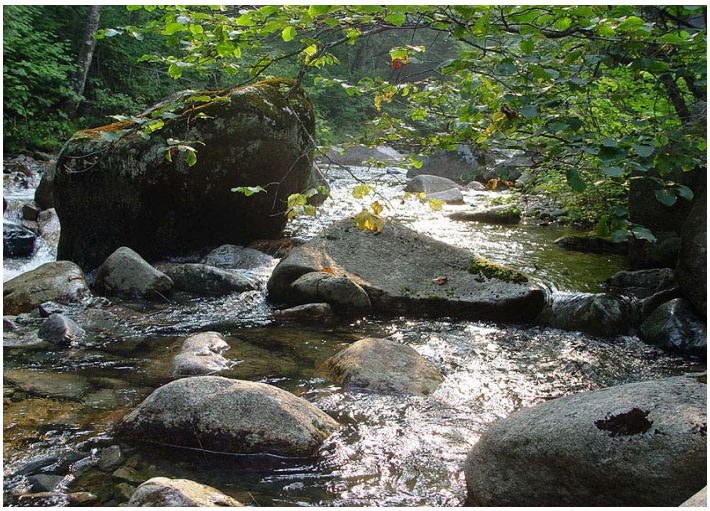
~Ken Kimball, Chair, Rivers Management Advisory Committee

Like many legislatively created advisory committees, New Hampshire's Rivers Management and Advisory Committee should ask itself each year: How did we do in meeting our charge under the 1988 Rivers Management Protection Program? What did we actually accomplish in the past year? Were we effective or did we mostly spend our time re-describing the problems and opportunities, but in reality were a poor catalyst for change? The scorecard for 2007 reads as follows.

Institutionally, change in committee membership is both sad as we see old colleagues leave and yet necessary to bring in new ideas and energy. Newly joining the RMAC, following Governor and Executive Council approval in 2007, were Anne Krantz, Historical/Archeological Interests; Alan Bartlett, Agricultural Community; Kathryn Nelson, Local River Management Advisory Committees; and Kevin Nyhan, NH Department of Transportation. To the outgoing RMAC members goes appreciation for their volunteer time and quality input.

The New Hampshire Rivers Management and Protection Program is made up of local advisory committees for each designated river, whose members contribute thousands of volunteer hours each year to protect the 15 designated rivers in the state. And in April of this year, EPA Administrator Stephen Johnson on Earth Day in Boston honored those who volunteer to protect New Hampshire's rivers. New Hampshire's rivers program is celebrating its 20th anniversary and Johnson made this prestigious award to the past and present local advisory committee volunteers. Without DES staff support, the volunteer RMAC would be a ship without fuel for its engine. Funds were reinstated by the Legislature to the RMPP for DES staff support.

The RMPP 2007 scorecard included a reversal of the continued loss of vital stream gages. Through the capital budget and teaming up with USGS, 15 stream gages are now in the process of being reinstituted. These gages are critical for pollution loading models, protecting instream flows and for flood and drought management. Riparian lands saw improved protection when the Comprehensive Shoreland Protection Act was strengthened, in part due to RMAC testimony. This included not only improved language for protection, but also increased the river-miles protected from 1,310 to 2,458 miles. The RMAC is legislatively charged with approving all state surplus land disposals that have a direct nexus with the state's rivers. In 2007, the RMAC reviewed ten proposed state surplus land disposals in this category; three proposals were approved as submitted, six



were approved with conditions, and one was tabled until a current study was completed.

On the legislative front, the RMAC sent letters with comments on 14 pieces of legislation and saw the successful revision of our legislation to include tributary drainage areas for designated river segments when developing long-range river management plans. RMAC members served on numerous rivers related state commission's including the Surplus Land Review Commission, Comprehensive Flood Management Plan Commission, and the Water Quality Standards Advisory Committee.

In 2007, the Ammonoosuc River brought the total number of rivers nominated and successfully designated into the RMPP to 15. River designation is achieved through a bottoms-up, local nomination process. These additional 45 river miles equates to a total of 822 miles of rivers designated and protected under the States rivers management and protection program.

Yes, the 2007 scorecard looks impressive. But we also took a larger view, and the RMAC teamed up with the Lakes Management Advisory Committee and DES staff to develop an overall "Rivers and Lakes Sustainability Initiative." Before proposing yet another plan, strategy or initiative, we asked how are we doing based on existing river related legislation, regulations and commissions. The scorecard from this analysis shows some serious challenges. (See chart on next page.)

Clearly, the state has had some major successes in protecting its rivers, but the "business as usual" model may not suffice in a state that is one of the fastest growing east of the Mississippi River. The RMAC is now working with the DES commissioner and staff to seek long-term pragmatic strategies that improve how the state addresses the wise stewardship and management of its rivers and lakes in the future.

Evaluation of the Rivers Management and Protection Program			
Statutory Requirement	**Question**	**Answer**	**Implication/Trend**
RSA 483:6 River-Nominations	How many rivers have been nominated for protection?	15 rivers have been nominated and designated encompassing 822 miles of rivers and streams.	Less than 1% of all river and stream miles in the State have been designated and thus protected under the RMPP.
RSA 483:8 VI and 483:14 Disposition of state owned land adjacent to providing access to river	Has the RMAC reviewed and made recommendations regarding the disposition of state-owned land adjacent to or providing access to a river?	Yes.The RMAC has a very thorough process whereby it evaluates and comments upon proposed state-owned land dispositions.	The State is receiving the input and expertise of the RMAC prior to making a decision regarding the disposition of state-owned land on or near a river or stream.
RSA 483:8-a, III (c) Local River Corridor Management Plans	Have local river corridor management plans been developed and implemented?	12 out of 15 designated rivers have existing management plans. Implementation is minimal. Direct funding and assistance for development and implementation is inadequate.	Insufficient resources are available to assist local river management advisory committees and the rivers coordinator to develop and implement management plans that can be adopted at the local level.
RSA 483:9, 9-a, 9-aa, and 9-b Designated River Water Quality	What percentage of designated river segments meet class B water quality standards (excluding mercury)?	Only 61% of designated river segments have been assessed for aquatic life and of those only 20% fully support this designated use. Only 49% of designated river segments have been assessed for primary contact recreation and of those 50% fully support this designated use.Only 53% of designated river segments have been assessed for secondary contact recreation and of those 98% fully support this designated use.	Insufficient data is available to make reasoned river management decisions on all designated rivers.
RSA 483:9-c Protected Instream Flow	Have protected instream flows been established for all designated rivers?	No.The current pilot study includes establishing protected instream flows for the Souhegan River and the Lamprey River.	RSA 483 called for the establishment of protected instream flows in 1988; the current pilot project began in 2003. The protected instream flow for the Souhegan River was established in April 2008.
RSA 483:10-a Designated River Long Range Management Plans	Have long-range management plans been established for all designated rivers?	No. The Exeter River has been selected for a pilot project.	RSA 483 called for the long range management plans in 1990. As of Spring 2008 none have been developed.

Key to Implication/Trend Status

Indicates minimal progress made towards programmatic goals due to lack of resources or implementation strategies.

Indicates some progress made towards programmatic goals, but additional resources are needed to meet goal.

Indicates programmatic goal has been met or significant steps have been taken towards meeting the goal.

New Hampshire's Shorelands Investment in the Future

~Jay Aube, DES Shoreland Program

Our state is blessed with a wealth of water resources. Verdant forests rooted in soils have evolved over thousands of years surround and buffer these waterbodies and are a natural provider of water quality protection. Historically, New Hampshire has valued its forests for their beauty and ability to provide a sustainable economic resource. But forests do much more than that – especially when they surround water. Forested buffers serve to control erosion, promote stormwater infiltration, retain sediment, take up excess nutrients, moderate near shore surface water temperature, provide wildlife habitat, and help facilitate groundwater recharge. In short, native trees and vegetation provide us with essential ecologic services.

In June of 2007, the legislature enacted important amendments to the Comprehensive Shoreland Protection Act. The CSPA provides protection to the state's public waters by establishing a 150-foot forested buffer area as well as restricted use areas within 250 feet of all lakes, great ponds, designated rivers, and fourth-order streams or higher and tidal waters. These amendments enhance the provisions of the CSPA, and were based on recommendations from a legislative commission convened in 2005 to examine the strengths and weaknesses of the statute.

The changes first became effective on April 1, 2008. However, legislation changing the effective date to July 1, 2008 for the majority of changes was enacted at the beginning of May. The provisions that remain in effect as of April 1 are the statewide 50 foot primary structure setback and the inclusion of the Pemigewasset and Saco rivers as fourth order streams protected by the CSPA. The bulk of the changes, now effective on July 1, 2008, are broad in scope, and are designed to strike a balance between the preferences of shoreland property owners and the need to protect our shoreland resource. The amendments establish a permit program for many construction, excavation and filling activities within the protected shoreland, a 50-foot waterfront buffer in which vegetation removal and pesticides and herbicides are restricted, and impervious surface limitations. An additional 1,391 miles of river have come under the protection of the CSPA as a result of the adoption of the New Hampshire Hydrography Dataset for stream order determination. All rivers designated under the state's Rivers Management and Protection Program Act, including the Saco and Pemigewasset Rivers, will now come under the protection of the CSPA. Other changes to the CSPA (see box) were made to clarify provisions related to vertical expansion, shoreline frontage requirements, a statewide primary building setback, and restrictions related to impervious surfaces. The current procedures to obtain waivers to expand the footprint of non-conforming structures or variances from the standards in RSA 483-B:9,V, such as septic setbacks, will still be available.

To promote broad public understanding of, and compliance with, the new CSPA provisions, DES has enlisted the assistance of many of our partners and stakeholders including Regional Planning Commissions, NH Lakes Association, NH Farm Bureau Federation, NH Home Builders and Remodelers, NH Association of Realtors, NH Municipal Association, NH Rivers Council, NH Timberland Owners, NH Conservation Commissions, NH Marine Trades Association, NH Wildlife Federation, NH Waterworks Association, and NH Natural Resource Scientists to develop and implement a major outreach effort to educate the public, contractors, municipalities and other interested parties. We all have an interest in the long-term integrity of our public waters. Through the CSPA and the stewardship efforts of shoreland property owners, we can ensure that future development of the shoreline protects water quality and the quality of life on our state's water bodies.

For more information please visit the DES Shoreland website at www.des.nh.gov/cspa.

Redefining the concept of "well distributed stand"

Until July 1, 2008, within 150 feet of the surface water, no more than 50 percent of the basal area of trees and 50 percent of the number of saplings can be removed in a 20-year period provided that a well distributed stand of all vegetation layers remains. With the implementation of the new legislation, the basal area calculation is eliminated and a **grid and points system** will be used to measure and maintain enough tree cover within 50 feet of the surface water (waterfront buffer) to buffer the waterbody. In the area between 50 feet and 150 feet (the natural woodland buffer), the restrictions on impervious surfaces and disturbed area will allow development while leaving vegetation to provide additional buffering capacity.

Other changes to the CSPA include:

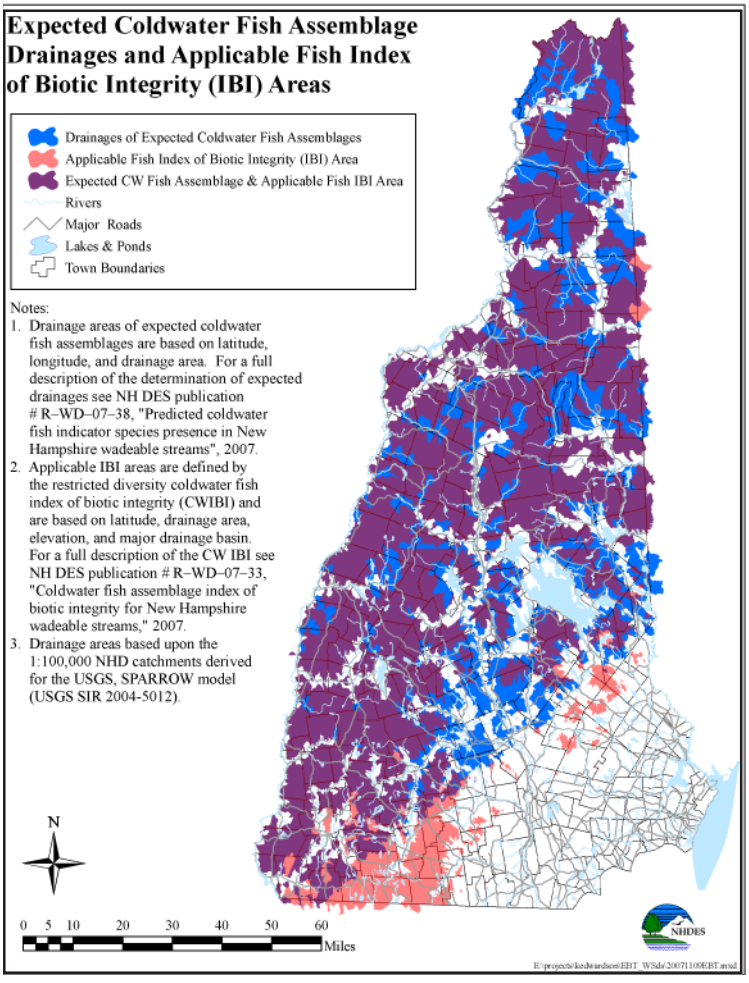
- The removal of the prohibition on vertical expansions of non-conforming structures.
- A statewide 50-foot primary building setback—no exceptions. Municipalities may continue to enact or maintain their own ordinances that establish greater setbacks.
- Requirements to leave a percentage of the vegetation with 50 feet and 150 feet in an unaltered state.

Biomonitoring Unit Develops Coldwater Fish Community Assessment Tools

~David Neils, Biomonitoring Program

Coldwater fish species are a valuable native natural resource of many New Hampshire aquatic communities. Generally defined as species that require water temperatures below 70° F and inhabiting well oxygenated waters, their occurrence are important indicators of aquatic community condition. As relatively sensitive species, they are expected to occur in minimally impacted waters. However, just like the observed variation in natural vegetative communities across the New Hampshire landscape, the natural occurrence coldwater fish species is restricted to waters where conditions are favorable for their survival, growth and reproduction.

As a first step in describing the current expected natural occurrence of coldwater fish species in New Hampshire's flowing waters, the DES Biomonitoring Unit utilized data from 163 minimally disturbed stream segments from which fish data was collected from 1997-2006. The analysis utilized brook trout and slimy sculpin as indicator species, and resulted in a model that was nearly 90 percent accurate in predicting their occurrence in first through fourth order streams. Latitude, longitude, and drainage area were the most important factors in explaining the distribution of the indicator species. The analysis demonstrated an increasing probability of occurrence for the indicator species as one moves from south to north, east to west, and from large to small streams.



Once coldwater streams were identified, a sub-set of the original sites was used to develop an index capable of characterizing fish community health at individual sites. The development process included the selection reference (un-impacted) and test (impacted) sites, identification of the best indicators of community condition (metrics), and establishment of an index threshold. The index threshold is analogous to a water quality criterion, such as bacteria, where numeric values above the threshold are considered safe, whereas, values below the threshold are indicative of unsafe conditions. The development process resulted in an index with potential numeric scores ranging from 9 (poor condition) to 45 (excellent condition) with a threshold of 30. A total of six "metrics" were identified as the most responsive to anthropogenic impacts and measured ecological attributes such as species diversity, reproductive success, dominance of pollution tolerant species, fish feeding strategies, and habitat preference.

The development of these tools greatly enhances DES's ability to complete formal water quality assessments as required by EPA, report on the condition of riverine aquatic communities, implement water quality standards, and make more informed permitting decisions. In the future, the Biomonitoring Unit will be developing additional fish indices specifically designed to evaluate the condition of cool and warm-water fish communities.

For a statewide map showing the expected natural distribution of coldwater fish communities or details about the coldwater fish community condition index, contact David Neils at (603) 271-8865 or david.neils@des.nh.gov.

Rock Snot Takes Over New Hampshire River

~Amy P. Smagula, Exotic Species Coordinator and Limnologist

Rock Snot? What? Are you kidding? Sadly, no kidding is involved here. During the summer of 2007, New Hampshire and Vermont biologists identified growths of an invasive alga species, not so affectionately called *rock snot*, in the Connecticut River near Bloomfield, Vt.

Upon closer inspection, the presence of *Didymosphenia geminata*, or Didymo (*rock snot*), was indeed verified in the Connecticut River. Didymo is a diatom, which is a family of algae common in New Hampshire's waterbodies. Like many organisms though, most have some species that tend to be "well behaved" and beneficial in our waterbodies, and some that are deemed "invasive." Didymo is an invasive diatom species, and its distribution is more extensive than originally hoped. Didymo infestations in the Connecticut River extend from just north of Lake Francis in Pittsburg, down through Northumberland, which is about a 44 mile section of the river. Below this reach, water depths deepened somewhat, and mats were not observed. However, the planktonic cells were likely present in the water column, and would be moving downstream to more suitable habitat to form their "blooms" on the shallower rocky zones of the river. In spring 2008, Didymo was also confirmed in the Mohawk River in Colebrook, near the Bungy Road Bridge off Route 26.

Unlike the image that surely comes to mind when one hears the term *rock snot*, this alga is not green and slimy. In fact, this alga is microscopic in size when it is in the water column, but it eventually falls to the bottom of the river and excretes a stalk that connects it to the rocks on the river bed. The stalks can reach lengths of several

inches, and can form dense brownish to whitish growths on the rocks that feel like wet cotton or wet felt when touched. There is no slimy feel whatsoever.

Little was known about Didymo in this region, as it tends to be a more polar species that is found in colder climates than are typically found in this region. Didymo was originally documented in Polar regions, in Norway, parts of northern Europe, and in the Canadian Northwest. In the last few years, Didymo has been found in the Northwestern United States, New Zealand, the Southeast, and now in New England. In fact, the more that biologists started looking for Didymo, in this region, the more they found. Didymo was documented in the Delaware River in New York and Pennsylvania, the Batten Kill River in Vermont and New York, the White River in New York, and in the Connecticut River between Vermont and New Hampshire in 2007.

We are actively monitoring Didymo to determine what potential risks it poses to the chemistry, biology, and the ecology of our rivers. We do know that it is not very aesthetically pleasing. Generally images of clean boulder or cobble strewn river bottoms come to mind when thinking about New Hampshire's larger streams, particularly in the North Country. As can be seen in the picture shown here, that reality is quickly altered when Didymo takes over the river. We suspect, and data from other countries show, that the food web could be altered, which could have impacts to the ecology and to recreational values (fishing) of the river. Specifically, macroinvertebrate species are altered, which could have long reaching impacts on the sports fishery in effected rivers.

This is a new problem that we face in the future of our river systems in New Hampshire, and biologists will be working on this topic and tracking the issue. Fortunately, some assistance will be coming from the New Hampshire Rivers Council in the coming months. The Rivers Council is the recipient of an Exotic Species Prevention Grant from DES. This grant will allow the Rivers Council to hire summer interns to assist DES with outreach and education activities that pertain to the problem of Didymo, as well as with field monitoring and early detection activities for this nuisance alga. DES will train the interns in proper field monitoring activities, including disinfection within and between rivers, so that the monitoring network can be expanded to target as many areas as possible within a short timeframe during this upcoming summer.

Much more detailed information on Didymo can be found online at www.des.nh.gov/wmb/exoticspecies/didymo, including fact sheets, maps, frequently asked questions, information on how to identify Didymo, and contact information for biologists in New Hampshire and Vermont.

If you think you have found Didymo in your stream or river, please contact Amy Smagula at Amy.Smagula@des.nh.gov, or (603) 271-2248.

Geomorphic Assessments Point the Way to River Health

~Adair D. Mulligan, Conservation Director, Connecticut River Joint Commissions

River science has come a long way since the days when dynamite-toting river managers advised taking the "kinks" out of streams. Work to restore two related waterways to a more natural condition is underway in Colebrook, where an altered Mohawk River has been playing tricks on the Connecticut for 40 years.

This year the Connecticut River Joint Commissions, working with Field Geology Services and the town of Colebrook, will restore the alluvial fan on the lower Mohawk River and the riverbank on the Connecticut River below the Mohawk confluence. The lower Mohawk River was artificially straightened years ago for the purpose of moving water and ice more quickly. A geomorphic assessment of the area by CRJC in 2004 revealed that increased sediment delivery through this "straight pipe" created an exaggerated gravel bar in the nearby Connecticut. The build-up of sediment dramatically altered the larger river's current, forcing it against the soft bank at the Colebrook Business Park and endangering property that is of great economic importance to the town.

Connecticut River oxbow in Lyme, N.H.

On the Mohawk River, engineered log jams will help recreate side-channels to capture excess sediment and provide much improved aquatic habitat. Feasibility studies in 2007 showed that this work, below a railroad crossing that functions as a berm, would not invite further flooding.

On the Connecticut River, bioengineering techniques will be used to restore 500 feet of eroded riverbank just upstream from another long section restored by CRJC in 2006. An extensive riparian buffer of native woody material will be planted and monitored for several years.

Conservation easements are an important part of the project. In 2007, the Colebrook Development Corporation and RobJac donated easements on the Connecticut riverfront land to the local Conservation Commission. The town will place a similar easement on the area of the lower Mohawk's alluvial fan. All of the easements provide for continued public fishing and walking access. The Connecticut River in this area is well-loved by fishermen.

"The town of Colebrook has been extremely helpful," observes Sharon Francis, executive director of the Connecticut River Joint Commissions, "and understands the need to base this complex project on solid science. We also appreciate DES's recognition of the erosion threat to the business park." The agency has provided consistent support for research and river restoration in this ecologically important part of the watershed. Matching funds have come from the Upper Connecticut River Mitigation and Enhancement Fund of the NH Charitable Foundation.

CRJC is engaged in a multi-year study of the northern Connecticut River and selected tributaries in conjunction with Dr. John Field of Field Geology Services. Among our discoveries is that a full third of the 85 miles of the Connecticut River from Murphy Dam in Pittsburg to Gilman Dam in Dalton was straightened in the late 1800s, probably for log drives. The river has been attempting to restore a natural path ever since. For more information on this research, including erosion maps for the nine northernmost Connecticut River towns, visit www.crjc.org/erosion.htm.

www.des.nh.gov/rivers/

New Water Resources Plan for the Connecticut River

~Adair Mulligan, Conservation Director, Connecticut River Joint Commissions

In 1997, New Hampshire Gov. Jeanne Shaheen and Vermont Gov. Howard Dean ceremonially launched the first edition of the *Connecticut River Management Plan* in a red canoe as they paddled the river in the shadow of Mt. Ascutney and the famed Cornish-Windsor Covered Bridge. A decade later, the Connecticut River Joint Commissions and their five local river subcommittees have issued a new and expanded version of the plan, focusing on water resources.

The project began in 2005 with the nearly 80 citizens of the five local subcommittees, who started with results of a one-summer water quality study of the river by DES and EPA. Findings of two EPA sediment quality studies, an EPA fish tissue toxin study, evaluations of Vermont tributaries, and a healthy dose of common sense and local knowledge of the river also went into the mix. Each subcommittee lists over 100 recommendations aimed at local, state, and federal entities.

The five subcommittees delivered their findings to CRJC in the spring of 2007, reporting priority concerns in their regions. These are as disparate as erosion from marina-spawned boat traffic in the south to protecting farm equipment and livestock from sudden high water in the far north. A team of river commissioners then combed the five plans for threads of riverwide significance and brought them to the full CRJC, who adopted a new Riverwide Overview in January 2008.

The new water resources plan for the Connecticut River echoes some familiar themes from the 1997 plan, but there are new notes as well. The benefits of riparian buffers and the need for Vermont to catch up with New Hampshire in enacting shoreland protection remain key priorities for CRJC. Natural valley flood storage, riverbank erosion, stormwater management, and dam operations are still on the list. New topics of focus include climate change, mercury, acid mine drainage, instream flow, and groundwater protection. The topic of invasive aquatic species took on new significance with the discovery in 2007 of the invasive diatom Didymo in the river's uppermost reaches.

David Deen fly fishing on the Connecticut River in Colebrook

"This plan represents the combined thinking of over 100 concerned citizens from all over the watershed and from many points of view," notes Adair Mulligan, CRJC Conservation Director, who worked with the five subcommittees and the commissions over the three years of the plan's development. "We think this process has distilled and clarified the most important issues now facing New England's largest river, and shows the way to river health for anyone who cares to participate, whether it's a riverfront landowner, a town road crew, or a state agency."

Among them:

- Anticipating stormwater impacts from climate change, town planning boards and commissions should encourage new stormwater engineering practices such as "low impact development" designs, to reduce runoff and promote stormwater infiltration. New Hampshire towns should survey culverts and bridges to identify those that are undersized and poorly placed for fish passage.
- Protecting floodplains from development would benefit public safety, agriculture, recreation, wildlife, and scenic values. A town which permits building in its floodplain may be unwittingly creating a public nuisance by contributing to flooding of another across the river or downstream.

CRJC's water resources plan for the Connecticut River watershed is posted at www.crjc.org/waterresourcesoverview.htm.

Japanese Knotweed, a Beautiful, but Dangerous Invader

~Sharon Meeker, Lamprey River Advisory Committee

One of the most lush, beautiful and overwhelming invasive specie is the Japanese Knotweed (*Polygonum cuspidatum*). Growing 2-3 meters high, its bamboo-like stalks support a profusion of shiny green leaves and white, lace-like blooms. Its canopy is so dense that it excludes native plants and alters the distribution and development of most riparian plant communities. While it may have some food value for aquatic insects, and probably provides micro-habitats for tiny amphibians and vertebrates, it seems mainly to be a nuisance that is almost impossible to control.

It has a tangled root mass several inches below ground and extends rhizomes 20+ feet in all directions, producing new plants with every season. Although knotweed grows very fast starting in early April and continuing into the early fall, it does die back during the winter. Spring flooding of rivers and streams often carries small patches of knotweed along in their current and deposits them along banks and on floodplains where the weed enthusiastically takes roots and proliferates. Even a very small piece of root, stem or leaf can produce a new plant. The seeds begin to form in July, and as they drop to the ground, they also can take root.

In May 2007, the Lamprey River Advisory Committee and its sister organization, the Lamprey River Watershed Association organized a river clean-up at Wadleigh Falls on the Lamprey River, and began an attack on the invading knotweed. Several different treatment methods were tried: cutting close to the ground and covering with cardboard and several inches of mulch; cutting and dabbing stalks 50 feet from the river with Round-up; digging up the root balls of individual plants; and just cutting the plant to the ground. All four treatments had some small effect in diminishing the weed, but in the fall when we returned to check, we found the cardboard had disintegrated, most of the dabbed stalks were still growing slowly, and the cut stalks and dug rootballs had continued to grow. Undaunted, we cut it all down again and enjoyed a beautiful view of Wadleigh Falls through the winter. But as soon as the weather warmed, the knotweed began appearing in all of the places where it had been cut in 2007.

What rings through in most of the research that we have studied so far is "cut, cut and cut" during the growing season, and pick up and burn (when dried out) all clippings, over a period of several years. Some studies also suggested cutting stalks within 2-3 inches of the ground and inserting a herbicide containing glyphosate, or brushing the cut stem with the herbicide. Herbicides such as Rodeo, which does contain glyphosate, have been found to be effective if applied carefully as a spray or directly applied to cut stalks. Round-up, which also contains glyphosate, however, has been shown to kill tadpoles and to have reduced algae and fish populations, according to studies by Dr. Rick A. Relyea, University of Pittsburgh, Pennsylvania and others.

So, choices of treatment are limited. The LRAC and the LRWA have secured funding for a pilot project on knotweed elimination at Wadleigh Falls and near the town hall in Epping. We have consulted with the NH Department of Agriculture's Douglas Cygan, Invasive Species Coordinator, Dr. Thomas Lee, Department of Natural Resources at the University of New Hampshire, in addition to reading many studies relating to knotweed control. This Lamprey partnership has hired Rachel Stevens, of Birch Tree Conservation Consulting to coordinate the project and to lend her technical expertise and contacts with state, regional and national organizations involved in invasive species control. The affected areas are being mapped and the exact procedures are being decided on. Careful records will be kept and there will be a prepared report at the end of the program. One goal of this project is to be able to assist land-owners with information that will help them control Japanese knotweed on their property.

David Deen follows the mantra "cut, cut, cut" as he attacks an area of Japanese knotweed.

If you have information that might help us meet the challenge of eliminating Japanese Knotweed, please contact us at Julie_Ibsill@nps.gov; dawn.genes@lrwa-nh.org or s-meeker@comcast.net.

A Guide to Invasive Upland Plant Species in New Hampshire is available from the NH Department of Agriculture, Markets & Food, Division of Plant Industry, PO Box 2042, Concord, NH, 03302-2042.

Exeter River Watershed Fluvial Geomorphic Assessment & Watershed Management Plan

~Sally Soule, Coastal Restoration Coordinator

Increasing areas of land in the coastal watershed in particular, are rapidly being converted to suburban and urban land uses with accompanying increases in impervious surfaces and loss of natural riparian buffers. This increase in urbanized land use results in hydrologic impacts with a negative effect on a number of waterways in the basin. A study of coastal New England streams in August 2000 indicated that the greatest change in aquatic communities may occur between low and moderate levels of uban intensity (Coles and others, 2004). Without a managed approach to development within the Exeter River basin, the long-term negative impact to aquatic life caused by physical changes, due in large part to human activities, will be significant. The frequency and intensity of flooding events will increase the susceptibility of portions of the drainage basin to erosion, sedimentation and other adjustments to the hydraulics of watercourse channels within the watershed. The ecological potential of a river is directly linked to the stability of its riparian corridor and floodplain function. Impacts to rivers from destablilizing activites such as channelization can reduce the river bed and riparian structures upon which aquatic life depend. (Cahoon and Kline 2003).

The objective of the project is to study the fluvial geomorphology of the Exeter River watershed and develop a watershed-based management plan to address potential habitat management and restoration activities. The science and discipline of fluvial geomorphology—the study of a drainage system's form and functions, including impacts from human actions—has received an increasing amount of attention in recent years for its potential to contribute to stream habitat restoration and flood hazard mitigation. The Exeter River watershed represents an ideal area for this project based on documented aquatic life use impairments, fish passage issues, flooding, and on-going restoration efforts. Additionally, the watershed contains a mixture of both relatively undeveloped and rapidly suburbanizing landscapes, and there is a significant amount of local and state support for the project. In particular, the project would not be possible without an $81,000 grant from FEMA, which funds the Phase I GIS analysis portion. The project will allow the DES Rivers Management and Protection Program, Watershed Assistance Section and the NH Coastal Program and its project partners, Exeter River Local Advisory Committee, town of Exeter, Bear Creek Environmental, LLC, Rockingham Planning Commission, and NH Geological Survey, to obtain information to assist state and local planners in prioritizing and targeting restoration and management projects within the watershed. This project will also serve as the model for restoration in other coastal watersheds, as it is based on a nationally recognized steam geomorphic protocol and provides watershed partners with detailed short and long term restoration and planning priorities.

Approximately 50 miles of stream reaches in five subwatersheds will be assessed through this project. Reaches will be prioritized based on known aquatic life use impairments, local concern, and on-going restoration activities. Multiple assessment activities will occur for each river-mile. This project will enable DES to develop specific recommendations for on-the-ground restoration and protection actions for assessed reaches. Reaches will be located in the Lower Exeter River, Dudley-Bloody Brook, Upper Exeter River and Fordway Brook. (Table 1.)

Table 1. Subwatershed River Miles and Assessment Activities per River Mile

Subwatershed name	River miles	Descrip. of assessment activities conducted per river mile
Lower Exeter River	10.0	• Stream Channel Stability
Dudley-Bloody Brook	11.0	• Riparian Buffers
Upper Exeter River	18.8	• Flow Modifiers (Culverts & Bridges)
Fordway Brook	8.6	• Rapid Habitat Assessments
Total River Miles:	**48.4**	• Rapid Geomorphic Assessments

The approach to assessing a watershed using a geomorphic-based focus consists of implementing successive phases of data gathering over a six-month period. The results and conclusions will be utilized to develop a watershed-based plan over the following two months. The plan will include recommendations for restoration actions such as shoreline stabilization, riparian buffer restoration, in-stream habitat restoration and stream crossing improvements. Recommendations for floodplain management will also be presented in the plan. Once the study and plan are finished, grant funding will be available to implement recommendations from the watershed-based plan. DES will work with local municipalities and watershed groups to prioritize and implement specific restoration projects over the following year. The entire process is expected to take approximately two years from beginning to implementation.

Long-Range Management Plan for State Owned Lands for the Exeter River

~Laura Weit

In 1990, RSA 483:10-a called for the development of a long-range management plan for state-owned lands within designated river corridors and tributary drainage areas to protect instream values. To date no long-range management plan has been developed.

The Rivers Management Advisory Committee voted in January 2008 to develop a pilot long-range management plan for the Exeter River Watershed. The Exeter River was chosen due to its size, amount of state-owned land, local protection efforts and data availability. Based on the results of the pilot study and the adoption of a long-range management plan for the Exeter River Watershed, long-range management plans for other designated rivers will then be developed.

Over the next year and a half, RMPP staff will be leading this effort, gathering existing data, facilitating meetings, drafting chapters, and coordinating the overall effort. RMPP staff will also act as a liaison between the Exeter River Local Advisory Committee and the state agencies. This plan will be extremely useful for future state and local planning efforts in the Exeter River corridor and tributary drainage area.

Photo by Jen Drociak, DES.

RSA 483:10-a Long-Range River Management Plans

The department shall prepare and adopt a long-range comprehensive plan for each designated river or segment which shall address the management and protection of instream values and the management of state-owned lands within the corridor and tributary drainage areas thereof. Such state-owned land within the designated river corridor and tributary drainage areas shall be administered and managed in accordance with the plan, and state management of fisheries, streams, waters, wildlife, and boating shall be consistent with the plan. In developing this plan, the department shall cooperate with the department of resources and economic development, the department of fish and game, the office of energy and planning, the department of agriculture, markets, and food, the department of transportation, and the local rivers management advisory committee.

Mark Your Calendars: Watershed Conference 2008

~Laura Weit

The annual Watershed Conference, sponsored by DES, NH LAKES and the New Hampshire Rivers Council, will be held on Saturday, November 15 from 7 a.m. to 4 p.m. at the Grappone Conference Center in Concord.

This annual event brings watershed stakeholders together to address environmental topics related to lakes, rivers, ponds and their watersheds throughout the state. It allows you to join peers from local river management advisory committees, volunteer monitoring groups, lake associations, watershed associations, municipalities, conservation commissions and non-profits; attend informational workshops; exchange river and watershed initiative ideas; view displays; and come away with renewed enthusiasm for protecting the aquatic resources you love!

If you missed out on the 2007 conference, you can review its proceedings, as well as those for the 2006, 2004 and 2003 conferences at www.des.nh.gov/WMB/WatershedConference/.

For more information about the 2008 conference, please go to www.des.nh.gov/WMB/WatershedConference/, or contact Laura Weit at (603) 271-8811 or laura.weit@des.nh.gov. We hope to see you there!

Exeter River LAC Builds on a Decade of Successful Partnerships

~Donald Clement, Chair, Exeter River Local Advisory Committee

The Exeter River Local Advisory Committee celebrated its 11th year of stewardship of the river and watershed in 2007. The year was marked by productive partnerships with several organizations, including the Rockingham Planning Commission, DES, NH Coastal Program, and NH Estuaries Project. These partnerships provide ERLAC with an opportunity to work with local Conservation Commissions to advocate effectively for the protection of natural resources throughout the watershed.

ERLAC partnered with the Fremont Conservation Commission to hold the eighth annual vernal pool workshop in May. Children and adults waded into woodland pools to identify salamanders, turtles and clusters of frog eggs. Development of forestland threatens vernal pools in every watershed community.

In June, ERLAC partnered with dozens of environmental and community organizations and several local artists to hold the seventh Exeter River Alewife Festival and canoe and kayak race. Funding to support this event was provided by the NH Coastal Program and DES. ERLAC looks forward to working with Conservation Commissions and other organizations in the watershed on a new series of activities in 2008, which will take place throughout the year and in many locations.

Several ERLAC members spent the summer working with the NH Coastal Program to collect and identify macroinvertebrates in the Exeter River and its tributaries. These intrepid volunteers waded into the water at several locations to capture and identify bugs hiding under rocks in rapid sections of the river. Macroinvertebrates are used as an indication of water quality. ERLAC members are also actively monitoring water temperature and other indicators as part of the DES Volunteer River Assessment Program.

In October, ERLAC partnered with the Sandown Conservation Commission and DES to hold a family friendly workshop explaining how to identify macroinvertebrates and why they are an important indicator of the impacts of land use on water quality and quantity. Four of the fastest growing communities in New Hampshire are located along the Exeter River and ERLAC is working to raise awareness of threats to water quality and quantity.

And finally, ERLAC has also been working with DES and their consultant on a Watershed Restoration Plan. The first phase of the plan, a vulnerability analysis, has just been completed and identifies sections of the Exeter River and the watershed most impacted by development. The next phase of the project will involve management and restoration plans for these areas.

ERLAC meets monthly and anticipates another productive year in 2008, continuing the successful partnerships for the good of the river.

Isinglass River LAC News

~Elizabeth Evans, Chair, Isinglass River Local Advisory Committee

The Isinglass River LAC had a productive year working with the Strafford Regional Planning Commission to develop our river management plan. We sent out a new survey to riparian landowners and local officials to assess attitudes toward the river as they might have changed since our river was first designated. We were pleased to see that stewardship of the river and riparian habitats, as well as water quality, were still key values for people in our communities. We are also in the process of developing a new stream assessment worksheet for use in our summer water quality monitoring program, and we are looking forward to incorporating stream assessment into our testing program this coming summer. We look forward to completing our first river management plan in the coming year, and having more time to spend on public outreach and education. Look for our new website www.isinglassriver.org, which we hope to have up and running later in 2008.

Swift River News, Updates and Teamwork

~Chip Boisvert, Secretary, Swift River Local Advisory Committee

In 2007, the Swift River Local Advisory Committee continued to make progress on its long term project: the Conway Scenic Railway Bridge. Headwaters Hydrology was chosen to handle the task. Sean Sweeney, principal of Headwaters, has taken core samples and performed geotechnical testing. The goal is to realign the Swift River as it approaches the bridge to prevent further erosion around the abutment.

The SRLAC continues to work closely with NH Department of Transportation and the US Forest Service on road improvements along the Kanc. Anyone who has driven this very scenic highway will notice the improvements!

In early 2007, our committee discussed approaching the Saco River folks about a combined rivers cleanup. The SRLAC has been doing a very successful cleanup for several years along the Swift. The Saco cleanup has been going on for the past couple of years. Both rivers are also cleaned on a regular basis by the U.S. Forest Service on the Swift, and the Saco River Runners on the Saco. Our newest (and most enthusiastic) member Kathy Carrier took on the task of setting up a meeting with the Saco members. Our first meeting was at the boat landing on Lovewell's Pond. It was here that we first met volunteer Michelle Broyer from the Saco River. She was checking all boats before they entered the pond for invasive plants. It was also here that I realized how big an undertaking this could become! Representatives from the SRLAC, The Nature Conservancy, Saco River Recreation Council, Saco River Corridor Commission and from all the canoe and kayak rental facilities attended this meeting. The SRLAC also has a representative from the U.S. Forest Service serving on our committee. But, Kathy and Michelle hit it off long before the meeting, and so by the time we met, they already had an agenda! Everyone eagerly divided up tasks and made suggestions.

I realized that the reason the meeting went so well was because we all share the same passion: a love of the Swift and Saco Rivers and the beauty of the Mount Washington Valley.

Several meetings followed. Sponsors were pooled. T-shirts were printed and flyers were posted. And then the big cleanup arrived. Lots of trash was removed (so many people still don't get "Leave No Trace"!). We also held a cookout and raffle for all participants on the shores of the Saco. The only change we may plan for next year will be two cookouts!

We chose to hold the Swift and Saco River Cleanup the weekend after Labor Day each year. We hope you can join us in the fall.

Piscataquog River Local Advisory Committee Update

~Dick Ludders, Acting Chair, Piscataquog River Local Advisory Committee

The Piscataquog River Local Advisory Committee's primary focus is the review of permit applications forwarded from DES but we have also followed and encouraged two other areas of interest along the river.

The first has been to educate ourselves on the issue of sludge spreading in close proximity to the river, finding that this is a complex issue. We have erred on the side of caution and consistently been advising against the use of sludge products for excavation restoration near the river.

A second area we have consistently monitored and supported is the creation of a recreational trail along the river following the former B&M Rail line through Goffstown and into Manchester. When completed, the trail will provide a non-motorized transportation connection from central New Hampshire to the seacoast by connecting to other existing trail systems.

The active town representatives in the PRLAC are from Manchester, Goffstown, New Boston, Weare and Francestown. We also have an at-large representative who brings strong science knowledge to the committee from his work at NH Fish and Game. The committee continues to meet the third Monday of each month at 6:30 p.m. in the Emma Sawyer Room of the Weare Public Library.

Protected Instream Flow

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and as completely as possible.

In March 2007, DES held a public hearing to solicit comments and answer questions concerning the proposed protected instream flows for the Souhegan Designated River before the protected flows became final. The comments were evaluated and the report was corrected in some cases and clarified in others, or the comments were simply responded to in detail beyond the scope of the report. All the comments and questions and DES's responses were incorporated into the report in an additional appendix.

In the fall of 2007, the commissioner determined that a document summarizing the program and the requirements for establishing the protected instream flows was needed. The declaration of establishment needed to describe the instream flow pilot program, the science and findings of the Protected Instream Flow Report, and the steps taken to meet the rule requirements for establishing the protected flows as water quality standards. One of the interesting details contained in the Declaration of Establishment for the Souhegan Designated River is that the river was divided into two segments with separate protected flows for each. The Souhegan River begins as a small stream in upland terrain marked by steep slopes. Near the Wilton/Milford town border the river has a confluence with Stony Brook, a major tributary, and also flattens out into a meandering river on shallower slopes. Because of the difference in character of these two segments, different aquatic animals and vegetation live in and on the water with different flow needs. The upper segment occasionally needs higher flows than are needed to support the species in the lower segment. A copy of the declaration can be found on-line at www.des.nh.gov/Rivers/Instream/souhegan/documents/pisf_signed.pdf.

Now that protected instream flows are established for the Souhegan, a water management plan can be completed to describe the management actions that will be taken by dam owners and water users to ensure these flows are met. The water management plan is made up of three sub-plans. The sub-plans are to direct conservation, water use, and dam management when the protected flows need to be supported. Each dam owner and water user affected by the rules will have their own plan that will tell them what their management role is when protected flows are not being met. Their plans will be keyed to a website maintained by DES that will describe the existing conditions relative to the protected flows. The website will look at recent stream flow values provided by the US Geological Survey and identify whether the protected flows are being met or are threatened.

The Instream Flow Pilot Program also incorporates the Lamprey River. The Lamprey protected instream flows have been developed and are currently under review by the commissioner. A public hearing will be held before finalizing and establishing the protected flows for the Lamprey River.

The Lamprey pilot project has benefited from the reviews of the Souhegan analysis and reporting. The Lamprey Pilot Project is also testing methods for expanding protected instream flow studies to larger rivers including use of remote sensing for flow assessments. More information about the Lamprey River pilot project can be found online at www.des.nh.gov/Rivers/Instream/lamprey.asp. Very high resolution imagery may be used to evaluate habitat conditions by referencing these conditions at locations along the river and using the imagery to fill in the sections between. The testing will show whether this technique works and the spacing that is necessary to maintain high levels of data quality.

The Protected Instream Flow Program is making slow, but steady progress. The techniques tested and innovations made during the Pilot Program will result in streamlined processes for other Designated Rivers. A successful pilot program will show that with a little effort, protection of instream flows can meet both in-stream and off-stream water needs.

See "The Natural Flow Paradigm" by Wayne Ives on next page.

RMPP 20th Anniversary Poster on Sale Now!
This beautiful, full-color poster commemorates all of the past and on-going efforts on behalf of New Hampshire's designated rivers. The 24" x 16" poster is printed on recycled paper and is only $5 – making it a great gift! To order, contact Josh Cline, New Hampshire Rivers Council, at (603) 228-6472 or josh@nhrivers.org.

www.des.nh.gov/rivers/

The Natural Flow Paradigm – Critical to Instream Flow Protection

The Natural Flow Paradigm[1] provides the conceptual framework for describing protected instream flows. The Natural Flow Paradigm is a concept which recognizes that maintaining natural variability is the most critical component of managing water quality. It also establishes that it is necessary to use a comprehensive set of descriptive terms in order to adequately define stream flow. Without this framework, the goal of describing protected instream flows that support flexible management providing water for both instream needs and off-stream use would be extremely difficult.

The goal of describing protected stream flows is difficult because stream flow is a complex and variable regime. The flow of a river varies over time, on an hourly to yearly or longer basis. New Hampshire stream flows typically fluctuate over three orders of magnitude (high flows are a thousand times greater than low flows) both during the course of a year and also on individual days over the period of record. Stream flows are highly variable because they are a function of a number of geomorphological and climatic parameters. The natural variability of stream flows determines the stream dimension, pattern and profile, all of which in turn determine the flora and fauna that can live in the stream and on stream margins. Protected flows must recognize and incorporate this variability in stream flow or risk describing protection in static terms as too restrictive or lenient.

Furthermore, describing protected flows requires a determination of whether a particular day's stream flow is appropriate for meeting instream flow needs. This must be done not only within this context of a variable flow regime, but also relative to the changing needs of the species that rely on stream flow. Native fish and riparian vegetation and wildlife have varying flow needs during the year that complement the river's annual cycles. This is not because they are lucky – these species survived because they were adapted to take advantage of those river conditions. Describing protected flows for these entities must therefore recognize changing seasonal needs of these species' life cycles.

Also, because of stream flow variability within seasonal durations, stream flows are not always optimal for river species, yet these species persist and thrive. Survival can continue at low flows, but not if they persist overlong. High flows are necessary, but can also be harmful if sustained. Even though optimal conditions for these flow-dependent entities do not occur continuously, they must occur long enough and often enough to support life-stage needs for spawning, growth of young, and survival. Flows that meet life-cycle needs in the summer may not be sufficient to meet different cycles at other times. Determining sufficient stream flows must be placed in the context of previous flows such that flow conditions occur with characteristic frequency and duration and in season. In addition, life cycle needs will not be the same for differing species, they may in fact be directly opposite. The variability in a natural flow system provides for entities with opposing flow needs because their flow needs are periodically met as flow conditions change.

Describing protected flows therefore requires a description of stream flow that is capable of encompassing a complex flow regime. And it must also use a systematic determination of whether the current conditions within the context of recent flows support the needs of flow-dependent entities. The stream flows of the natural flow regime are suited to the river's ecosystem needs, not to just one species. By describing protected flows within the framework of the Natural Flow Paradigm, protected flows meet the flow needs of all the adapted species.

To describe protected instream flows within the Natural Flow Paradigm requires a more comprehensive description of stream flow. Because of the complexity inherent in the flow regime, a single value of magnitude would not adequately describe stream flow. Neither would prescribing a single value as a protected flow be sufficient to describe the range of flow needs. The description of flow under the Natural Flow Paradigm uses components of magnitude, frequency, duration, timing and rate of change. A comprehensive description using these components provides the detailed representation of flow and of flow needs that allows both water use and support of riverine entities.

By framing protected instream flows within the Natural Flow Paradigm, flow-dependent entities are protected, yet unrealistic flows are not required because variability is allowed. This more complex description of a complex system describes flow in a way that allows naturally occurring conditions like low flows to occur without considering these events as a crisis, yet limits them in frequency and duration to what the ecosystem has evolved to tolerate. Water for off-stream use will be available because the wide range of variability in stream flows together with the flexibility of instream flow provides space between what is needed instream and what is available. Management is needed to supply water for off-stream uses when that space is limited. The Natural Flow Paradigm provides the framework needed to define protected instream flows.

[1] Poff, N. L. et al. 1997. The Natural Flow Regime. BioScience Vol. 47, No. 11: pp. 769-784.

20th Anniversary

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protection on designated rivers has been state law since 1990, but progress was slowed by disagreement about appropriate methods. With the advice and input of the statewide Rivers Management Advisory Committee, DES adopted Instream Flow Rules in May 2003 that apply to the Souhegan and Lamprey Rivers. The rules describe the process for conducting a protected instream flow study and developing a water management plan to implement the study results. As of April 2008 protected instream flows have been established for the Souhegan River with the Lamprey River to follow in late fall 2008.

If the pilot program is successful, the rules would be amended before they can be applied to other designated rivers. It is hoped that the time needed to accomplish instream flow and water management plans for other designated rivers will be shortened due to the methodology the pilot study established. Given adequate funding and support in the next ten years, several more designated rivers will have established protected instream flows.

Recently the RMAC voted to conduct a pilot study to develop a long-range management plan for state-owned lands in the Exeter River Watershed. RSA 483:10-a calls for the development of a long-range management plan for state-owned lands within designated river corridors and tributary drainage areas to protect instream values. The Exeter River was chosen due to its size, amount of state-owned land, local protection efforts and data availability. Based on the results of the pilot study and the adoption of a long-range management plan for the Exeter River Watershed, long-range management plans for other designated rivers will then be developed.

The RMPP is also continuing the Protected River Sign program in 2009. So far, we have eight rivers with a total of 140 designated river signs. Our goal is to have a sign for every designated river at every stream crossing! These signs are available for all local advisory committees as a way of making the public more aware of the special status of their river. When possible, DES will continue to help LACs pay for these signs. For more information, please contact Laura Weit at (603) 271-8811 or laura.weit@des.nh.gov.

Protecting the viability of New Hampshire's rivers for the benefit of present and future generations is one of the cornerstones of the legislation that established the RMPP. As we look into the future the viability of our rivers will become more difficult to maintain due to increased pressure on our natural resources. To help sustain this viability, the RMAC and the Lakes Management Advisory Committee (LMAC) joined together in December 2007 to approve the Sustainability Initiative. This initiative recognized that even with the tremendous efforts and progress made towards protecting New Hampshire's rivers and lakes that some issues need to be addressed further. Over the next several months the RMAC, LMAC and DES staff will be developing environmental and programmatic indicators related to invasive exotic species, water quality data availability, and coordinated watershed management as a first step in this effort.

With the support of the Rivers Management Advisory Committee, the local advisory committees and other partner organizations, we can continue to protect our state's outstanding river resources for future generations. If you are interested in learning more about the RMPP, please visit our website at www.des.nh.gov/rivers. If you live in a town where a designated river is located and you would like to get involved with river activities or if you are interested in nominating a river, please contact DES Rivers Coordinator Steve Couture at (603) 271-8801 or Steven.Couture@des.nh.gov for further information.

EPA Award

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Bush's call to serve a cause greater than themselves," said Johnson. "Dedicated volunteers like these are inspiring others to join them in delivering America a brighter, healthier future."

The volunteers spend countless hours at meetings, performing site walks, conducting water quality monitoring, developing and implementing river management plans and hosting river festivals. The 15 designated rivers they are protecting cover over 800 river-miles and involve more than 50 percent of New Hampshire's communities.

The President's Volunteer Service Award was created at the president's direction by the President's Council on Service and Civic Participation. The award is available to youth ages 14 and under who have completed 50 or more hours of volunteer service; to individuals 15 and older who have completed 100 or more hours; and to families or groups who have completed 200 or more hours. For more information about the award, please visit www.presidentialserviceawards.gov.

Wildlife Action Plan Update

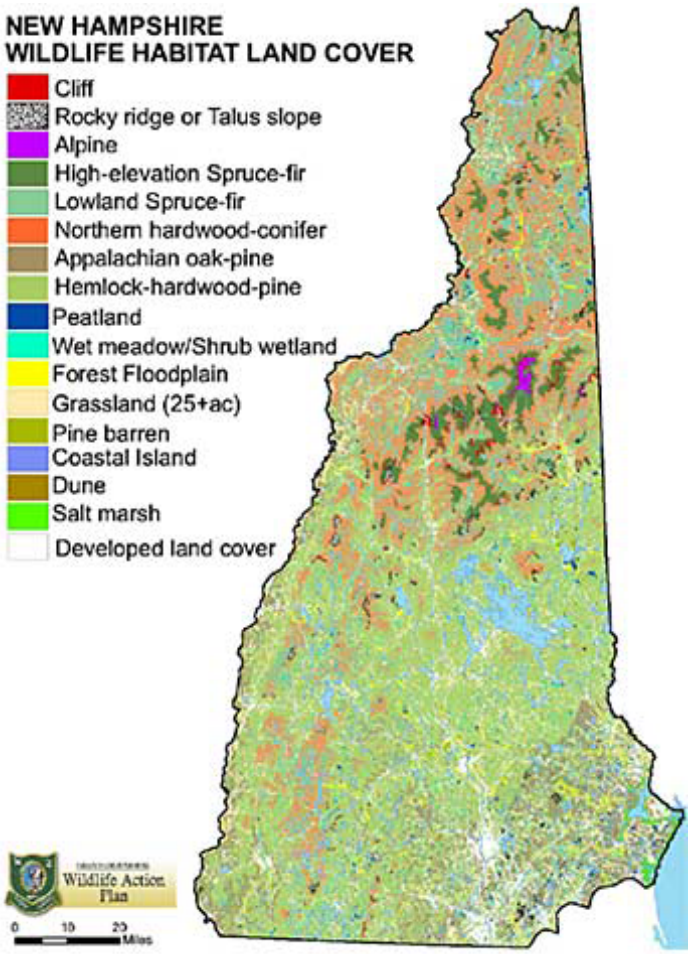
~John Kanter, Nongame and Endangered Wildlife Program Coordinator, NH Fish & Game Department

Efforts to carry out the New Hampshire Wildlife Action Plan are in full swing! In the past year, biologists have been working to make habitat maps and information more accessible to the public and to provide training to local communities and land use planners on how to use the Wildlife Action Plan for conservation in their region.

The New Hampshire Wildlife Action Plan, mandated and approved by the U.S. Fish & Wildlife Service, is the state's most comprehensive assessment of wildlife and their habitats. Based on scientific research, it identifies species and habitats at risk, assesses threats to their continued existence and offers strategies to address those needs. The Wildlife Action Plan focuses on the species of greatest conservation need, while addressing the full array of wildlife in the state.

"What's new and really exciting is that habitat maps from the Wildlife Action Plan are now available to everyone," said Emily Brunkhurst, a biologist with the Nongame and Endangered Wildlife Program. The wildlife habitat maps created as part of the Wildlife Action Plan can be viewed online through UNH's GRANIT Data Mapping Program. "Anyone can go online and make a Wildlife Action Plan map of their community," said Brunkhurst. "They can see the different kinds of habitats in their area and learn which ones are the most important for wildlife." Click on the Wildlife theme in the data mapper, which can be found at http://mapper.granit.unh.edu. For more information about these maps, go to the Wildlife Action Plan pages at WildNH.com.

A Habitat Stewardship Series of brochures has been created to help landowners and land managers recognize the habitats critical for wildlife species at risk and provide better habitat through conservation, management and sound land stewardship. "Brochures for four habitat types are already available, and there's more to come," said Brunkhurst. Brochures available now include the floodplain forest, marsh and shrub wetlands, grasslands and vernal pools. These can be found by visiting WildNH.com or the UNH Cooperative Extension website at http://extension.unh.edu/Wildlife/Wildlife.htm.



In addition to making more information available online and to the public, biologists have also met with land use planners in all regions of the state. They are teaching people how to use the N.H. Wildlife Action Plan to identify the best areas to target for conservation to benefit the greatest diversity of wildlife. According to Brunkhurst, over 1,500 people from more than 140N.H. communities have already attended Wildlife Action Plan workshops! Upcoming workshops are listed on the Fish and Game Wildlife Action Plan web pages.

"We are also adding new types of workshops," Brunkhurst said. "For example, we've partnered with the UNH Cooperative Extension to provide training on how to use the Wildlife Action Plan tools to conduct natural resource inventories." Natural resource inventories identify where the natural resources exist in a town or a region, including features such as wildlife habitat, drinking water, wetlands, floodplains and economically important soils. If a community is interested in hosting a natural resource inventory or using the habitat maps workshop they can find out more about it by contacting Lindsay Webb at N.H. Fish and Game at (603) 271-2461

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NEW HAMPSHIRE DEPARTMENT OF Environmental Services

NH Rivers Management & Protection Program
PO Box 95
29 Hazen Drive
Concord, NH 03302-0095

Action Plan

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or Lindsay.Webb@wildlife.nh.gov.

Since the N.H. Wildlife Action Plan was approved in April of 2006, biologists have worked diligently to implement the plan. "The Wildlife Action Plan is what we do every day," said Brunkhurst. "All of the on-the-ground projects and field work that has been done over the past two years is part of implementing the Wildlife Action Plan." Creating tools such as the wildlife theme of the data mapping program and habitat stewardship brochures will help others to use the Wildlife Action Plan, as well. "Everything we do is linked to the Wildlife Action Plan," Brunkhurst said. "In addition to providing a comprehensive wildlife plan for the state, the Plan was intended to guide the work of the Nongame and Endangered Wildlife Program and that is exactly what it is doing."